ABSTRACT OF THE DISCLOSURE

The architecture for converged broadband wireless communications comprises two separate parts with different functionality. The first part, called converged wireless terminal, supports any common air interfaces (wireless standards) of either wireless mobile system or wireless access system, wherein a Common Air Interface Basic Input/Output System (CAI-BIOS) is the key function element. The second part, called Common Access Point, supports any said air interfaces to the said converged wireless terminal, and also supports any network interfaces to the All-IP or Packet Division Multiplexed backbone networks. The two parts construct a new architecture for the convergence of broadband wireless access and wireless mobile communications.

BRIEF DESCRIPTION OF THE DRAWING

FIG.1 is a basic block of conventional wireless communications;

FIG.2 is the invented architecture of the converged broadband wireless communications;

FIG.3 is the invented architecture of the Common Access Point with CAI-BIOS;

FIG.4 is the invented architecture of the converged Wireless Terminal with CAI-BIOS, as well as a functional sample of the designed terminal.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG.1 is a basic block of the conventional wireless communications where each terminal and base station only supports one single air-interface, and the wireless network is "circuit-switched" and "time division multiplexed". Hence, for different applications and air interfaces, different equipments must be used. This architecture is very expensive, poor spectrum utilization and not cost-effective, etc.

FIG. 2 shows the invention of the new architecture of the converged broadband wireless communications. All the basestation equipments (BTS, BSC, MSC, etc.) are integrated into one open function entity called "Common Access Point" (CAP). On the right side of CAP (see "A" in FIG.2), it supports any network interfaces to the All-IP or PDM (packet division multiplex) backbone core networks; on the left side of CAP (see "B" in FIG.2), it connects all common air interfaces (or wireless standards). The All-IP protocol has been extended to the converged Wireless Terminal (WT), and the wireless signaling is now End-to-End which makes the WT a very smart terminal (e.g. Security, Information Recognition and Bandwidth-on-Demand, etc).

The CAP is really a breakthrough because it provides a public and open access function to the backbone All-IP PDM networks which greatly simplifies the wireless networks. The convergence of different common air interfaces greatly improves the design of traditional wireless transceiver systems. Each user (with this same and one converged wireless terminal) has only one personal number, but is capable to communicate in different air interfaces – either automatically or manually.

Because of the All-IP PDM model, the "physical" switching is not necessary or just combined with the backbone networks. The previous base –station controlling has been partially distributed to the backbone networks and to the smart wireless terminals (end-to-end direct signaling) as well as the CAP.

This architecture is also essential for the future total convergence of wireline communications and wireless communications when at that time, any terminal can connect to any CAP anywhere in the All-IP PDM networks.

This inventive architecture improves the optimal utilization of wireless spectrum, bandwidth, wireless traffic control and wireless system performance.

FIG.3 shows the invented architecture of the Common Access Point (CAP). The key function block of CAP is the Common Air Interface – Basic Input/Output System (CAI-BIOS) which maps the different air interfaces modules (GSM, GPRS, UMTS, 802.11, 802.15, 802.16, WLL, etc) to the open processing engines (base-band and control) as well as broadband transceivers and RF/IF modules. These common air interfaces modules can be uploadable from the backbone networks, remote networks or just stay in the local CAP disks, etc. The network interface unit (NIU) supports all network interfaces (Fiber Optical, ATM, DSL, Cable, Ethernet, etc) to the backbone All-IP PDM networks.

This generic architecture is very friend to any new air interface modules or network interface modules, and very important for future multi-dimensional convergence of wireless and wireline communications, communications and computers, etc.

FIG.4 shows the invented architecture of the converged Wireless Terminal with the CAI-BIOS as the key function unit. Same as in CAP, the CAI-BIOS maps the common air interface modules to the open processing engines, the broadband conversion unit and the RF/IF unit, and vice verse. However, because the wireless spectrum is very expensive and the terminal capacity (processing, memory, power, etc) is very limited, we need to use the SIM card or Memory Stick, etc to load the different common air interfaces modules.

As an example, FIG.4 also shows a sample of this converged wireless terminal. The terminal can automatically connect to the CAP through one available air interface (wireless access preferable as first choice). But the user has the option to select his favorable air interface within the service area.

Three commands (Input or Output) are necessary:

- Security, including Finger Print or others. This is to establish the relation between this converged wireless terminal and the user. By printing your finger into this "hole", you are responsible to pay the services, contents, etc for the communications. Any registered users can use this converged wireless terminal.
- Information Recognition, including voice recognition and pattern recognition. There is no keyboard or keypad available for this converged wireless terminal. After you use the terminal, your voice pattern gets trained or you can input your initial pattern when signing-up for the service. But the user still can have the option to purchase the additional small wireless keyboard supported by this converged wireless terminal. Other pattern recognition is also supported.
- Bandwidth-on-Demand. The terminal can provide an automatic datarate for each service, but the user has the option to select other datarate and request more bandwidth by pressing this "button".